

Application No. 10/559,965
Paper Dated: August 7, 2009
In Reply to USPTO Correspondence of March 9, 2009
Attorney Docket No. 5946-091619

REMARKS

Claims 1-9 and 12-32 and 34-38 are currently pending in this application. Claims 10, 11, 33 and 39-41 have been cancelled, without prejudice to filing one or more divisional or continuation applications directed to the canceled subject matter.

Claim 1 has been amended, without prejudice, to incorporate the subject matter of claim 11. Claim 23 has been amended, without prejudice, to incorporate the subject matter of claim 33. Claim 27 has been amended, without prejudice, to clarify that the removal means is for removing hydrogen, unreacted reactants and inert low boiling hydrocarbon medium, and the flashing means is for separating the polymerized olefins from the inert low boiling hydrocarbon medium, unreacted reactants and hydrogen, as discussed below. No new matter has been added to the application by the foregoing amendments.

At page 2 of the Office Action, claim 10 has been objected to under 37 C.F.R. §1.75(c), allegedly as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Office Action asserts that the limitations recited in claim 10 are already present in the independent claim 1. To expedite allowance of the pending claims, claim 10 has been canceled without prejudice. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to claim 10.

At pages 2-3 of the Office Action, claim 27 has been rejected under 35 U.S.C. §112, second paragraph. The Office Action contends that no function is recited after the “removal means” and the “flashing means”. While Applicants disagree with and traverse this rejection, to expedite allowance of the pending claims, claim 27 has been amended to clarify that the removal means is for removing hydrogen, unreacted reactants and inert low boiling hydrocarbon medium and the flashing means is for separating the polymerized olefins from the inert low boiling hydrocarbon medium, unreacted reactants and hydrogen. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

Claims 1-38 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,469,110 (“Harlin et al.”) in view of PCT Publication No. WO 2002/41986 (“Mutsers”). The Office Action contends that Harlin et al. in Figure 1 discloses a polymerization process for preparing polypropylene in a reactor system comprising pluralities of reactors. The Office Action alleges that Harlin et al. (col. 11, lines 17-48) clearly indicate that their polymerization process comprises a prepolymerization reactor (1), a first loop reactor (40), and a second gas phase (fluidized bed) reactor (60). According to the Office Action, Harlin et al. (col. 16, claim 24) allegedly clearly teach that a third gas phase reactor can be installed.

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Regarding the polymerization temperature and pressure requirements of claims 4, 7, the Office Action contends that Harlin et al. (col. 8, lines 48-65) clearly teaches the polymerization temperature of from 40 to 110°C and the pressure of 30 to 100 bar, which allegedly meet the requirements as claimed.

Regarding the claimed “liquid phase” of claim 3 and the “propane” of claim 6, the Office Action contends that Harlin et al. (col. 5, lines 62-64) clearly teaches the use of propane as a medium.

Regarding claims 8 and 9, the Office Action contends that Harlin et al. (col. 11, line 33, item 50) clearly discloses the presence of a flash separator for removing hydrocarbons and/or hydrogen, which are clearly present in the reactor (col. 8, lines 35-40).

The Office Action concludes that in view of the substantially identical processing condition, reactants, and apparatus disclosed in Harlin et al. and as claimed, the Examiner has a reasonable basis to believe that the claimed “the loop reactor is adapted to work under supercritical conditions” is inherently possessed in Harlin et al., since claim 25 allegedly fails to set forth any conditions or features that are required for running the polymerization process under supercritical conditions.

The Office Action acknowledges that a difference between the invention as claimed and the process of Harlin et al. is that Harlin et al. does not teach a process involving a second reactor comprising a moving bed under such conditions that the residence time in the fluidized bed and the residence time in the moving bed are independently controlled.

The Office Action contends that Mutsers (Abstract) discloses a polymerization process wherein a fluidized bed reactor comprises a reaction chamber 4 that Applicants allegedly characterized as a fluidized bed, and a reactor 2 which comprises one or more connecting pipes (10) running outside the reactor chamber 4, which Applicants’ specification (page 10, lines 2-7) allegedly characterized as a moving bed. Regarding the claimed “independently control” feature, the Office Action contends that Mutsers (page 10, claims 1, 2, 4) clearly indicate that one or more connecting pipes running outside, where the cross-section ratio of the pipes to the reactor’s cross-section can vary from 0.1 to 1.0, the angle can vary between 0 to 60 degrees. The Office Action contends that, motivated by the expectation of success of introducing fresh monomer at the connection of the connecting pipes to the wall of the top part of the reactor chamber or to the wall of the outlet section (page 4, lines 1-5), it would have been obvious to one of ordinary skill in art to replace the fluidized bed reactor of Harlin et al. with the fluidized bed reactor of Mutsers to obtain the fluidized bed reactor having the “moving bed” as claimed.

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The Office Action contends that the Examiner has a reasonable basis to assert that the teachings of Mutsers have adequately taught the means for the claimed “independent control” feature in view of Applicants’ specification (page 9, lines 15-24) which allegedly states the requirement on how “independent control” can be achieved. The Office Action notes that although applicants’ specification (figures 2 and 3) indicates some specific features, such as inlet and nozzles installed in the moving bed for the purpose of “independent control”, the features described in the specification can not be read into the claims. Therefore, the Office Action concludes, the rationale for the instant reaction allegedly is adequate in view of the §112 rejection set forth above.

Regarding claims 10-18, 21, which contain process related features, such as “condensed mode”, “a separation fluidum”, “the residence time in the moving bed is independently controlled”, and “the residence time in the moving bed is controlling by controlling the outflow rate of particles from the moving bed”, the Office Action contends that since Harlin et al. clearly teach a process and apparatus that are substantially identical to the one as claimed, the examiner has a reasonable basis that any minor variation of such teachings is considered obvious because motivated by the expectation of success of obtaining the polymerization process of Harlin et al, allegedly it would have been obvious to one of ordinary skill in art to vary the process of Harlin et al. to obtain the features of claims 10-18, and 21.

Applicants respectfully traverse these rejections and request that the rejections be reconsidered and withdrawn.

As reiterated by the Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, 82 U.S.P.Q.2d 1385 (2007), the framework for the objective analysis for determining obviousness under 35 U.S.C. §103 is stated in *Graham v. John Deere*. Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc., 72 Fed. Reg., No. 195 (October 10, 2007) at page 57527 (hereinafter “Examination Guidelines”). The factual inquiries enunciated by the Court are as follows:

- (1) Determining the scope and content of the prior art;
- (2) Ascertaining the differences between the claimed invention and the prior art; and
- (3) Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines at page 57527.

Harlin et al. discloses a process and apparatus for polymerizing propylene, having at least one slurry reactor and at least one gas phase reactor (Abstract). *The Office Action*

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acknowledges that Harlin et al. does not disclose a process involving a second reactor comprising a moving bed under such conditions that the residence time in the fluidized bed and the residence time in the moving bed are independently controlled.

Mutsers discloses a fluidized bed reactor having one or more connecting pipes running outside the reaction chamber and connecting the bottom part of the reaction chamber with the top section thereof and/or with the outlet section of the fluidized bed reactor (Abstract).

The disclosure of Mutsers does not cure the above deficiencies in the disclosure of Harlin et al. In contrast to the presently claimed invention, Mutsers does not suggest or disclose that the connecting pipe (10) of Mutsers would operate in a settled bed mode. Further, Mutsers does not suggest or disclose that the residence time of the polymer in connecting pipe (10) would be independently controlled from that of the polymer within the fluidized bed (4).

Mutsers does not disclose whether the polymer enters the pipe (10) from the top opening (16) or the bottom opening (12). If the polymer entered through the bottom opening (12) and exited through the top opening (16), then there would not be a settled bed but either a fluidized bed or a fast fluidized bed in pipe (10). And even if the polymer entered the pipe (10) through the top opening (16) and exited through the bottom opening (12), it appears that some gas would enter the pipe (10) through the bottom opening (12) and this would be likely to cause the polymer in pipe (10) to be in a fluidized state and not in a settled state.

Furthermore, Musters does not suggest or disclose controlling the outflow of particles from the connecting pipe (10), as specified in independent claims 1 and 23. Please note the text on page 5, lines 25-33 of Mutsers, which discloses that the upper opening is preferably smaller than the lower opening. Therefore, if the polymer present in the connecting pipe of Mutsers formed a settled bed (which is not conceded), then there would not be any control of the outflow. The inflow of polymer into the pipe (10) could be controlled by flushing with monomer (33).

Therefore, even if the disclosure of Harlin et al. was combined with the disclosure of Musters as set forth in the Office Action, the combination does not suggest or disclose a moving bed, that the residence time of the polymer in the fluidized bed would be independently controlled from that of the polymer within the moving bed, or controlling the outflow rate of particles from the moving bed, as specified in independent claims 1 and 23.

Accordingly, since Harlin et al., further in view of Mutsers, combined as set forth in the Office Action, fail to suggest or disclose at least one element of independent claims 1 and 23, the cited combination of Harlin et al., further in view of Mutsers, does not obviate these

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claims. Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claims 1-38 over the disclosures of Harlin et al., further in view of Mutters, combined as set forth in the Office Action.

Claims 40-41 have been rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Harlin et al. (U.S. 6,469,110).

Claims 40 and 41 have been cancelled, without prejudice to filing one or more divisional or continuation applications directed to the subject matter thereof. Accordingly, the rejection is moot and should be withdrawn.

For the foregoing reasons, Applicants believe that claims 1-9 and 12-32 and 34-38 comply with the requirements of 35 U.S.C. §112, are patentable over the cited prior art and in condition for allowance. Reconsideration of the rejections and allowance of pending claims 1-9 and 12-32 and 34-38 are respectfully requested.

Respectfully submitted,
THE WEBB LAW FIRM

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By 

Ann M. Cannon
Registration No. 35,972
Attorney for Applicants
436 Seventh Avenue
700 Koppers Building
Pittsburgh, PA 15219
Telephone: (412) 471-8815
Facsimile: (412) 471-4094
E-mail: webblaw@webblaw.com